1. The Specification provides 4 approaches for determination of flexural strength of composite beams. If a steel beam with a noncompact web is used as a composite beam, which method must be followed?

   a. strain compatibility  
   b. plastic stress distribution  
   c. elastic stress distribution  
   d. all of the above can be used  
   e. none of the above can be used

2. Which of the following is used to determine the location of the plastic neutral axis for a composite beam?

   a. maximum tension in steel  
   b. maximum compression in concrete  
   c. maximum force transferred by studs  
   d. a and b above  
   e. a, b, and c above

3. A composite beam is to be designed. It spans 36 ft and is spaced 8 ft from adjacent beams on each side. The slab is 3.0 in. of concrete on a 2.0 in. metal deck. What is the total effective width of the concrete to be used in strength determination?

   a. 24 in.  
   b. 40 in.  
   c. 60 in.  
   d. 96 in.  
   e. 108 in.

4. A W12x58 A992 beam spanning 36 ft supports a 4 in. flat soffit concrete slab with $f'_c = 5$ ksi. The effective concrete width is 70 in. What is the effective depth of the concrete flange?

   a. 2.08 in.  
   b. 2.86 in.  
   c. 3.57 in.  
   d. 4.0 in.  
   e. none of the above
5. A W12x58 A992 beam supports a concrete on metal deck slab with a total thickness of 5 in. and $f'_{c}= 4$ ksi. The effective depth of the concrete is $a = 2.0$ in. Determine the nominal moment strength.

   a. 428 ft-kips  
   b. 644 ft-kips  
   c. 715 ft-kips  
   d. 864 ft-kips  
   e. none of the above

6. Strength of steel headed stud anchors in a composite beam with metal deck must be reduced from the strength when used in a flat soffit slab. Which of the following influences the stud strength?

   a. deck orientation  
   b. number of studs per rib  
   c. strong or weak location placement  
   d. all of the above  
   e. none of the above

7. For the W16x26 selected in Example 5 from the presentation, determine the nominal moment strength if the total slab thickness had been 7.0 in. rather than the 5.0 in. used in the example and the stud capacity remained the same.

   a. 170 ft-kips  
   b. 193 ft-kips  
   c. 290 ft-kips  
   d. 322 ft-kips  
   e. 484 ft-kips

8. An A992 W18x40 is to be used in an application where full composite action is required. What is the minimum strength of the steel headed stud anchors required for this application?

   a. 148 kips  
   b. 274 kips  
   c. 590 kips  
   d. 650 kips  
   e. none of the above
9. A W-shape encased in concrete and loaded in flexure is called a composite member. The Specification provides 3 methods for determination of moment strength for this member. Which of the approaches is likely to give the greatest strength?

   a. elastic stress distribution
   b. plastic stress distribution on the steel alone
   c. plastic stress distribution on the composite section
   d. all will yield essentially the same strength
   e. an approach different than those listed should be used

10. If the member evaluated in Example 6 with a W14x53 had been encased in the center of a 21 in. deep section rather than the 22 in. section used in the example, the plastic neutral axis would have been 4.15 in. down from the face of concrete. Determine the nominal flexural strength for this member.

   a. 460 ft-kips
   b. 480 ft-kips
   c. 363 ft-kips
   d. 339 ft-kips
   e. none of the above